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ABSTRACT

Vocational education has accurately forecast the detrimental effects of increased graduation requirements. The initial response of vocational education has taken a variety of forms, some initiated at the state level, some by local boards and schools, and some addressed on a national or multistate level. The most consistent strategies pursued by state vocational programs to overcome effects of increased graduation requirements include seeking academic credit for vocational programs, instituting flexible scheduling, and instituting a seven-period day. Across states, several national or multistate curriculum development efforts have been launched to assist states in addressing the increased graduation requirements by conducting activities related to increased academics in vocational education. Local methodology for infusion of academic content has taken three primary tracts dependent upon staffing and teacher certification regulations--nonintegrative, integrative, and combinations. Staff development is critical, and many options exist. Strategies involve inservice training of vocational and academic staff on the need for working together. As states consider increased college admission requirements, vocational education will have to wrestle with the question of whether colleges will accept vocational courses for which academic graduation credit has been granted. (YLB)

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Responding to Increased Academic Graduation Requirements: National Perspective

Presentation To: Michigan Personnel Development In-service
Lansing, Michigan - March 8, 1989

by
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The reforms of the last decade spawned by public outcry over the condition of education has affected general and vocational education primarily by the institution of state mandated learning goals or competency levels to be achieved by all students in secondary education.

Concurrent with state goals for learning being established came the following actions by many states:

- Increased academic course graduation requirements in 45 states,
- Increased teacher certification standards in 42 states,
- Changed curriculum standards required for graduation in 32 states,
- Changed textbook adoption procedures in 32 states, and
- Lengthened school day, week or year in 24 states

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TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

Two years ago when I spoke to Michigan vocational educators on this topic, my message was to stress the need for infusion of academic competencies, to catalog state and local reactions with a prognosis for potential scenarios and to express optimism for the opportunity to revitalize vocational courses with the aid of academic colleagues. The suspected negative effects were not yet documented.

Today's perspective sees a fulfillment of the then-suspected effects on vocational enrollments and an even greater need to act on the urgings of the vocational legislation that calls for increased infusion of academic foundations in vocational curriculum.

Projected Effects on Vocational Education of Increased Graduation Requirements

The projected effects of the actions by states were seen as detrimental to vocational education. As students attempted to take additional academic course work to meet the increased graduation requirements, the limited time available would result in decreases in vocational enrollments, despite NCES national data that indicate over 90% of all high school students take at least one vocational course.

Students who otherwise would have taken a full vocational program would be put in the position of decreasing their commitment and the number of vocational programs would decline and even be phased out in some programs of low incidence.

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Strategies of State and Local Education Agencies for Increased Academic Foundations in Vocational Curriculum

State Responses	Credit	Content	Scheduling	Certification	Attitude	Funding	Credit Transfer
Local option to grant credit and amount of credit	Seek credit for existing program w/o change	Isolation of academic competencies	Flexible Scheduling	None	Inservice for local admin., tchr & counselor awareness of vocational education	None	Cite voc courses as academic on transcript
Local option w/documentation	Redefine program to meet state standards	Reduction of vocational content	Shorten periods	Course by course approval for vocational teacher to teacher	Increased counselor training	Inservice grants	Seek acceptance of voc ed as academic credit w/o course title change
State appl's for alternate credit by course time, grade level etc	Redefine program to meet state standards using fractional accumulation	Increased clustering	Increase number of periods	Grants or incentives for certification upgrades	Increased pre-voc recruitment	Additional funds for meeting state competency standards or program standards	
Program options by service area		Redevelopment of curriculum to meet state standards	Saturday School	Redocumentation of college academic work	"Sell" local boards on applied academics	Penalties if state standards not met	
Reduce recommended program sequences			Increase academic courses offered at area centers	Inservice on improved teaching skills	Increased adults in secondary programs	Reimbursement on FTE	
Defined credit variables			Increase semester course offerings	Team teaching	Establish stong coop with academic teachers at local level	Preferred Funding of voc ed with academic block	
Statewide conferences			Increase one year programs		Inservice to overcome voc teacher resistance		
Consortium membership			Increase emphasis on special vocational schools		Increased Career Education K-12		
Upgrade of credentialing			Increased SMR School Courses				
State content mandates							
Marketing voc ed							
State Consultants in Academics in SDVE							
Increased access to VE							

Figure 1

An increase in remedial classes, especially in the inner-city schools and other high population areas, would be expected in order for already academically deficient youth to be able to enroll in additional academic coursework. This effect would touch many vocational students whose basic skills were low, but whose basic skills would have benefited from participation in a vocational program.

Many students who would have stayed in school to take advantage of a vocational program would become distraught over increased academic graduation requirements and drop out of school rather than risk additional failure. The loss of vocational staff due to decreased enrollments and retirements was also seen as an inevitable consequence of the increased graduation requirements among the states.

Today we can say that all the projected effects were accurate. Between the 1982-1983 school year and 1985-1986 school year, 30 states reported a decline in their vocational enrollments (average 10.6%; range 1-41%). Programs at area centers and comprehensive schools are declining. Tennessee reports 230 program closings over the past few years. The drop out rates have risen, not yet dramatically, but increasingly. Teacher RIFs often target vocational staff while remedial staff are increasingly in demand.

What remains to be said is that vocational education has put forth an initial response to counter the effects because of a set of what the NCRVE BASICS (1987) curriculum materials call the:

Driving Forces to Infuse Academics

- The Need to Help Vocational Students Meet Academic Graduation Requirements
- A High Rate of Illiteracy
- Response to Business and Industry Needs
- Drop-out Prevention

Vocational education's initial response took a variety of forms cataloged in Figure 1. Some were initiated at the state level, some by local boards and schools, and some were addressed on a national or multi-state level.

The responses, especially at the state level, were tempered by several factors.

1. Effective Date of New Graduation Requirements.
2. State Demographics
3. State Teacher Certification Requirements
4. Local Autonomies

A longitudinal study of the effect of increased graduation requirements on enrollments was initiated by the Virginia Polytechnic Institute (VPI) in 1985. Data from this study (school year 82-83 through 85-86) have assisted in cataloging the experiences of state, changes in vocational enrollments. Enrollment figures were also viewed with respect to overall population and school age (14-17 years of age) population demographics. Disparities in trends between high school

and vocational enrollments were examined, ie., increases in high school enrollments with concomitant decreases in vocational enrollments and vice versa were determined.

In general, the study's latest report (Strickland, 1987) showed overall enrollment declines in 28 out of 46 states reporting and overall increases in high school enrollments in 18 states. Vocational education enrollments decreased in 29 states, increased in 15 states and remained stable in 2 states.

Data comparisons indicated that only four states (Alabama, Hawaii, Iowa and West Virginia) fell into the category of increased vocational enrollments and decreased high school enrollments.

In Alabama, most vocational increases have been in the pre-vocational, ie., non-occupational courses. Reduced T & I block and new approaches to programs were cited as reasons for increased enrollment.

In Hawaii, one year of practical arts is mandated at the 8th grade, a factor seen as an encouragement to stay in vocational education and one which also leads to increased female enrollments. Marketing vocational education and a strong career education program were also cited.

In Iowa, the major enrollment increases were in business education and marketing, possibly due to the report of a state-wide task force recognizing increased vocational education offerings which received wide press coverage.

Increases in West Virginia were attributed to strong guidance and TV marketing, a breakdown of blocks and a state graduation requirement to include one unit of applied arts.

	Incr'd Grad. Req's (Date)	Block Scheduling	Dupl. Prgs. Closed	Incr'd Local Grad. Req's.	Post Sec. Admission Increases	Demo-graphic Changes	Local Budget Cuts	Guid. Cslrs.
CA	X							
CO	X (86)							
ID	X (88)	X						
KY	X (86)	X						
MS	X		X					
TN	X (87)				X			
VA	X (84)							
OH	X			X	X			
MO	X	X		X		X	X	
SC	X							X
SD	X					X		
LA	X (85)					X	X	

Reasons for Decreased Enrollments
Figure 2

Of the twelve states experiencing decreased vocational enrollments and increased high school population, all identified the increased graduation requirements and at least one other factor for the decline. (See Figure 2) Below are cited the strategies planned by these states to offset future enrollment declines.

ID -
- Home Ec going to semester program delivery system
- Substitute 2 practical arts (vocational, pre-vocational or C & H) for 2 of 4 required humanities electives

MS-
- 7 period day
- State's new accreditation system requires offering vocational education
- Basic skills offered through vocational education in grades 9 and 10
- C & H and technical education programs restricted to grade 10 and below
- Hi-tech programs grades 11 and 12 only
- Reducing 3-hour blocks to various shorter combinations

TN -
- Flexible scheduling
- Guidance assistance
- School administrative workshops on infusing academics
- New graduation requirements require 1 unit computer literacy

VA -
- Graduation requirement change allows 1 credit practical arts to substitute for 1 credit humanities
- 7 period day (local option)
- Flexible scheduling
- Strong vocational education marketing program to recruit

OH-
- Modification of 3 and 4 hour block programs
- Funding programs with added block time for academics
- Reorganize courses of study around academics
- Funding of courses which give graduation credit

MO- 7 period day

SC -
- Recommend counselor imposed foreign language requirement
- Computer science = 1 math unit
- 6 units vocational education = 1 unit science

LA - Combined cooperative programs developed (ag., marketing, and home ec.)

In looking at strategies to increase enrollment by states with decreasing vocational enrollments combined with rationales by states experiencing increased enrollments, we can conclude the following as the most consistent strategies pursued by state vocational programs to overcome effects of increased graduation requirements.

1. Seek academic credit for vocational programs
2. Institute flexible scheduling
3. Institute 7 period day

Across all states a greater array of strategies can be found. The VPI Study and data collected through the National Network for Curriculum Coordination in Vocational and Technical Education (NNCCVTE) can be categorized as follows:

Response of Vocational Education To Effects of Increased Graduation Requirements

Local	State
1. Flexible Scheduling	1. Redefinition of State Program Standards
2. Remedial and Related Classes at Area Vocational Centers	2. Alternative Credit Options
3. Increased Number of Periods/Days	3. Acceptance of Vocational Education as Part of New Academic Requirements
4. Break Up of 3 and 4-Hour Blocks	4. Incentives for Pilot Programs, Curriculum Development and Teacher Certification
5. Increased 1-Year Programs	
6. Identification and Strengthening of Academic Content	5. Development of LAPs, Guides, etc.
7. Alternative Staffing and In-service	6. Consortia Membership
8. Applied Courses	7. Marketing Vocational Education
9. Individualized Academic Development Plans	
10. Identification of Entry Level Academic Skills.	

It should be noted, that in considering all the actions taken by states, few states can act independently, that is, provide action that affects all local schools. The majority of states operate with local autonomy. In many states the local boards have taken action to add even more courses to the state's increased academics required for graduation. Others, such as in Richmond, Virginia, have instituted requirements for all students to take a number of vocational courses. Therefore, the response of vocational education has two strands of identity - those actions or strategies typically pursued on the state level and those most frequently pursued at the local level.

Multi-State Responses

Across states several national or multi-state curriculum developed efforts were launched to assist states in addressing the increased graduation requirements.

Multi-State and National Consortia Activities Related to Increased Academics in Vocational Education

1. **V-TECS** - Vocational Technical Education Consortium of States, Atlanta, Georgia. A group of 24 states which jointly develop curriculum materials. V-TECS developed a taxonomy of academic competencies which are being infused into the products of consortium states.

2. **SREB** - Southern Regional Education Board, Atlanta, Georgia. A group of 13 southern states developing model programs of integrating academics in vocational education.

3. **CORD** - Center for Occupational Research and Development, Waco, Texas. A non-profit research group which is developing applied academic curriculum materials. Principles of Technology (Applied Physics); Applied Math; Applied Biology/Chemistry. Materials can stand alone or be integrated.

4. **AIT** - Agency for Instructional Technology, Bloomington, Indiana. Co-Producer of Principles of Technology with CORD; also Applied Communications, a one-year program.

5. **NCRVE/OSU** - National Center for Research in Vocational Education at Ohio State University, Columbus, Ohio. Vocational research center and producer of BASICS, a set of materials to assist in implementing joint academic-vocational programs.

6. **NNCCVTE** - National Network for Curriculum Coordination in Vocational and Technical Education, East Central Region, Springfield, Illinois. A national network to promote exchange and sharing of vocational curriculum.

A recent study by the Program Improvement Coordination Council of the National Association of State Directors of Vocational Education (Belcher, 1988) examined how states spent federal funds devoted to hi-tech and infusion of academics (Purpose #4 of VEA) between 1983 - 1988. Although projects spanned content areas and secondary/post-secondary emphasis, the most prevalent use of funds was for participation in consortia for the development of curriculum materials.

Other groups are also developing guidelines for vocational and academic infusion. Vocational education professional development associations are offering in-service and materials development in many states. The National Education Association (NEA) is creating guidelines to help educational agencies assign academic credit to vocational programs and design vocational programs to include academic material. That guide is to be available at their 1989 NEA annual meeting. The National Council on Occupational Education (NCOE) has jointly developed a guide for integrating the humanities into occupational programs with the Community College Humanities Association.

Methodology and Staffing

Truly effective interdisciplinary, cooperative, efforts are not easy to carry out. Many factors need to be considered and details of time, resources and commitment worked out.

Local methodology for infusion of academic content has taken three primary tracts dependent upon staffing and teacher certification regulations - non-integrative, integrative and combinations.

Most successful schools develop teams to spearhead the infusion effort. The team of administrators, counselors, and vocational and academic staff plan the implementation.

Staff development is critical and many options exist (See Figure 3). Strategies involve in-service of vocational and academic staff, preferably together, on the need for working together (See Figure 4 on Potential Roles). Counselors need to be involved to understand the benefits to students from joint efforts. Task analysis of vocational competencies and academic content are generated by both groups in short, intensive work sessions then compared, argued and strengthened as to sequencing and scope (See Figure 5 and 6 for sample formats). Decisions on what academic competencies are to be taught, resources and modes of delivery are jointly made. Reports of this process note that both academic and vocational staff develop a greater appreciation of one another's jobs. Academic teachers provide vocational programs with suggestions on teaching academic concepts while vocational teachers can provide academic staff with new practical applications of the concepts.

The look of the curriculum emanating from these joint developmental efforts is, as has been forecast, much leaner, but content-packed. Much of the nice to knows and the repetitive drilling material is deleted in favor of strengthened academic foundations and core vocational skills.

Content integration strategies, such as Michigan's Overlap Process, have been the most successful in identifying academic competencies in vocational courses to justify academic credit. Depending on state certification, teachers may be encouraged to be jointly certified (eg., agriculture and science certification) or team teaching and cooperative teaching may be used.

STAFF DEVELOPMENT ISSUES AND OPTIONS

Content and Audience

- Training for basic skills teachers
  - Vocational programs and goals
  - Program implementation
- Training for vocational-technical teachers
  - Basic skills upgrading
  - How to reinforce basic skills
  - Program implementation
- Training for aides, volunteers
- Training for all involved staff
  - Interdisciplinary approach
  - Using new materials

Resources

- Internal
- Other organizations
  - Teacher training institutions
  - State education departments
  - District
  - Other schools
- Outside consultants
- Teachers training teachers

Timing and Type

- Summer workshops
- Special seminars
- Periodic conferences
- Ongoing course work

Compensation

- Direct payment
- Released time
- Adjusted work load
- Fee reimbursement or waiver

Figure 3

POTENTIAL STAFF ROLES

STAFF ROLES	ADVANTAGES	DISADVANTAGES	TYPE OF PROGRAM
Basic Skills Teachers			
Remedial Teacher	Effective when skills are very low	In secondary pullout programs, students miss vocational content Stigma attached Occupational goals may be ignored	Remedial, nonintegrated staffing
Tutor	Effective when skills are low, students few Instruction can be tied to occupational goals Scheduling can be flexible	Time-consuming Not cost-effective if many students need help	Any type (compensatory, support-oriented, institutional; integrated or nonintegrated staffing)
Center Manager	Convenient Cost-effective with many students, diverse needs Can assume multiple roles Individual assistance possible	Without coordination with vocational teacher, may ignore occupational goals	Support-oriented or institutional (labs and centers)
Visiting Teacher	Vocational content motivates Occupational goals are focused on Takes burden off vocational teacher Expertise of basic skills teacher is used	Requires very close coordination	Support-oriented, integrated staffing
Advisor	Vocational teacher retains role of instructor Expertise of basic skills teacher is used Develops skills of vocational teacher in basic skills	Requires very close coordination	Support-oriented, integrated or combination staffing
Curriculum Developer	Draws on expertise, knowledge of both areas Produces materials geared specifically to vocational area	Time-consuming (but the materials last)	Support-oriented, institutional, integrated or combination staffing
Vocational Teachers			
Teaching or reinforcing basic skills	Vocational teacher is with students greatest amount of time Topics are highly motivational Teacher is familiar with occupational requirements	May be reluctant to take on added responsibility May lack training for basic skills instruction May have inadequate basic skills	Support-oriented, integrated staffing
Supplying goals, materials, etc., to basic skills teacher	Vocational teacher has access to occupational requirements	Basic skills are taught apart from vocational content; may lack relevance	Any type, nonintegrated staffing

Figure 4

Basics, NCRVE, 1987

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CORRELATION CHART EXCERPT: APPLIED MATH/AUTOBODY

Academic Goal I: The student will be able to apply the four basic operations—addition, subtraction, multiplication, and division—to whole numbers, decimals, fractions, and percents.

Academic Objectives	Vocational Activities
Whole numbers:	
Apply four basic operations	
Measurement using a ruler:	Analyze extent of damage to frames
Apply four basic operations	Operate damage dozier and attachment
	Repair and align a fram to manufacturer's specifications
	Replace the following: frame assembly, front frame section, frame horn or rear cross-member, rocker panel, front fender (bolted), cowel panel
Ruler fractions:	Determine direction of force or impact
	Determine hidden damage
	Rough out damaged panel
	Replace the following: front frame section, frame horn or rear cross-member, center pillar
Liquid measurement:	Mask operations
Denominate numbers	Apply striping and decals
Simplify feet/inches	Prepare for polyurethane enamel finishes
Rename perimeter using diagrams	Determine direction of force or impact
	Roughed out damaged panel
Apply four basic operations	Use plastic-type fillers
	Form sheet-metal patches
Convert to simplest form	Replace outer door panel
	Make a fiberglass patch panel

NOTE: The academic objectives (listed in the left-hand column) are met with specific application to vocational content. The math instruction focuses on the applications of math in the world of work, and the examples given and the problems solved are drawn from the occupation.

SOURCE: Montgomery County Joint Vocational School, Clayton, OH

Figure 5

INTEGRATED PROGRAM GRID

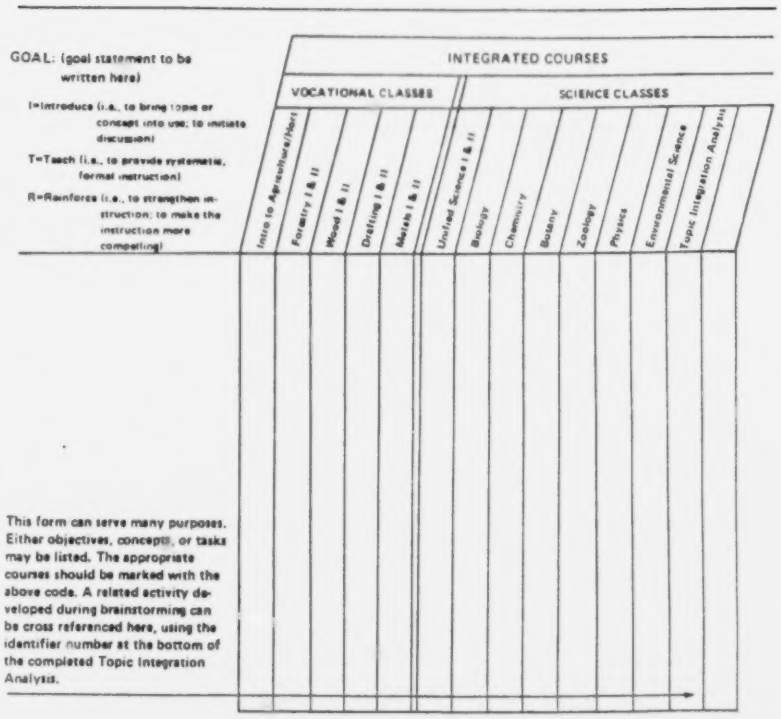
GOAL: (goal statement to be written here)
INTEGRATED COURSES
VOCATIONAL CLASSES
SCIENCE CLASSES
I=Introduce (i.e., to bring topic or concept into use; to initiate discussion)
T=Teach (i.e., to provide systematic, formal instruction)
R=Reinforce (i.e., to strengthen instruction; to make the instruction more compelling)
Intro to Agriculture/Hort
Forestry I & II
Wood I & II
Drafting I & II
Metals I & II
Unified Science I & II
Biology
Chemistry
Botany
Zoology
Physics
Environmental Science
Topic Integration Analysis
This form can serve many purposes. Either objectives, concepts, or tasks may be listed. The appropriate courses should be marked with the above code. A related activity developed during brainstorming can be cross referenced here, using the identifier number at the bottom of the completed Topic Integration Analysis.

Figure 6

Basics, NCRVE, 1987

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The issue of vocational teachers lacking basic skills upon graduation or entering teaching has come to the forefront with the advent of basic skills testing for teachers such as Illinois and Ohio are experiencing. Reinforcement in-service of vocational staff by academic teachers is often seen as a by-product of the joint development efforts when the appropriate helping climate has been set by the school administration.

Few studies are available, however states which became involved in academic and vocational integration early on, such as Ohio and Oregon, report that evaluation scores for both academic and vocational content have risen where the integrated approach has been implemented. Pre and post testing in courses, as well as school-wide basic skills tests have consistently shown increases.

On the Horizon

The next frontier on which academic content of vocational programs will be tested in the increased college admission requirements being passed or considered in many states. Currently Illinois, Idaho, Tennessee, Ohio and Arizona are a few of the states wrestling with this issue. State Boards of Higher Education are increasing academic entrance requirements beyond the high school graduation requirement levels, creating additional pressures on vocational programs and potential students. The immediate question is whether colleges will accept vocational courses for which academic graduation credit has been granted.

In Idaho the state university's agricultural education program depends largely on secondary vocational agricultural program for agriculture teacher education students. In Tennessee the state is negotiating with the BHE on a course by course basis (PT and agriculture accepted for 1 science credit; health occupational accepted for 1/2 credit science; marketing accepted for economics, etc.) and in Illinois a set of hearings just completed will lead to a report to the state legislature on the issue.

Arguments appear to be largely over course titles. Many colleges will accept vocational courses which have been retitled more readily than not (eg., Agricultural Science will be accepted at Idaho State University if it's called Earth Science and at the University of Tennessee if it's called General Science). However, the ultimate decision rests most frequently on the provision of competency lists or performance objectives for each course. Colleges with increased entrance requirements will be looking into course content in much more depth in order to make acceptance decisions.

Summary

Vocational education has accurately forecast the effects of increased graduation requirements and is taking positive steps to change the vocational curriculum to meet the requirements of legislation and the imperatives of the reforms.

The states are actively producing materials to assist in infusion and integration at the local level and allowing State and Federal Program Improvement funds for use in implementation. The real decision making that affects whether vocational students can continue to take vocational education and how vocational education can be given academic credit is happening at the local level.

Ralph Tyler, noted educator whose work and urgings for educational accountability were precursors to competency based education reports that "in my work on school improvement, I have found that it takes six or seven years to get a reform really working as intended" (Tyler, 1987). Local administrators have the challenge of providing leadership to academic infusion in vocational programs to make programs that work.

Essential Characteristics of Programs That Work

- Strong Administrative Leadership
- Strong Schoolwide Emphasis on Reading
- Good School Atmosphere
- Administrative Structure Set-Up to Facilitate Change
- Agreement Among Faculty and Administration
- Administrators With The Ability and Courage to Establish a Stable, Educationally Sound Curriculum
- Administrators Who Act As Instructional Leaders, Who Are Assertive and Who Assume Responsibility For Evaluation of Basic Skills Achievements to make programs that work.

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